Scenario "C"

The following wording is proposed for operational scenario "C".

> When high densities of vulnerable life stages of fish and other aquatic organisms are present within the significant zone of influence of the pumping plants, high entrainment rates and potential population-limiting losses could result. Reducing exports at such times when high adult-equivalent losses are likely to occur, as indicated through appropriate monitoring, will significantly reduce the likelihood of population-limiting losses. Increasing exports at times of low adult equivalent losses will increase water in storage for all purposes including environmental protection. Coupled with this scenario is the principle of an environmental water account that would allow banking of water saved.
>
> Water export operating constraints should be based on documented population-level effects to species of interest. Until such time as such relationships can be documented, a protective approach such as defined above as scenario "C" is warranted

Page/paragraph

ii/4

At the end of this paragraph, add the following sentences: "Not all DEFT members agree with all of the analytical methods employed by the majority, or the conclusions reached. Some of the most important areas of disagreement have been highlighted at appropriate locations within this report."

ii/5

Change to read: "...Stage 1 that a majority of DEFT members felt would improve chances..."

ii/6

First bullet, add to end: "(Operational criteria and assurances to be developed.)

ii/6

Second bullet, add to end: "(Operational criteria and assurances to be developed.)

iii/1

Fourth bullet, change to read: "...from present standards, perhaps in combination with..."

iii/2

The last sentence ("The DEFT team has not evaluated or recommended these actions…") is not clear at all. Suggest replacing this last sentence with the following: "The following water supply actions have not been evaluated by DEFT, except to the extent that they were a component part of the changes identified above."

1/2

[Due to pagination errors, this is actually the last page of the "Executive Overview"] The last sentence refers to "...greater net flows in the south Delta toward the pumping plants...". This sentence should be edited to provide a clear context (greater than what?).

1/3

For clarity, change the second sentence to read: "...the new scenario provides additional benefits in the form of additional export restrictions in dry years beyond the Common Program..."

The third sentence refers to "...negative effects of greater net flows in the south Delta toward the pumping plants..." but the antecedent not clear; greater than what?

Change the fourth sentence to read: "...little benefit to delta smelt, unlike striped bass and salmon, since salvage mortality for this species is extremely high."

2/2

[Due to pagination errors, this is actually the first page of the "Introduction"] Here and elsewhere, change references to "the DEFT team" to "the DEFT".

Change the last sentence to read: "...the DEFT looked at structural, operational and habitat actions that would benefit fish and increase the potential for recovery of threatened and endangered fish, and would also benefit unlisted salmon and striped bass."

2/3

Change the first sentence to read: "...array of actions that the majority of the DEFT felt would improve the performance of..."

Change the last sentence to read: "...results of the analysis using methods favored by the majority of members are presented in this report."

2/4

Change the first sentence to read: "...further refinements in structures, habitat enhancement measures and operations is possible."

2/5

Change the second sentence to read: "Efforts continue at evaluating and revising actions and improving evaluation methods."

Change the last sentence to read: "...conclusions reached by the species teams and a majority of the full DEFT."

3/2

Change the last sentence to read: "...an array of new or revised actions that the majority of the DEFT felt would pose less risk to and a higher potential for..."

3 & 4 The organizational composition needs to be updated to reflect current team organization; i.e. those who have not contributed to the current round of evaluations should not be included in the listing.

4/1 ff.

The following is suggested to replace the current introduction of this section.

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To meet this goal, the team developed a series of objectives based on identified hypotheses regarding factors that control fish populations and their production and/or survival in the Delta. There were some differences of opinion among DEFT members regarding the validity or relative importance of certain underlying hypotheses. The principal difference of opinion revolves around the issue of whether net flows or monthly average conditions (for example, Q-West, net Delta outflow, net negative flows in certain delta channels, net monthly average San Joaquin flows at Antioch, etc.) are satisfactory indicators of environmental conditions influencing the production and/or survival of fish in the delta.

A majority of the DEFT members felt that average condition parameters are good indicators of aquatic environmental conditions. A minority of members felt that, since net flows are a very small fraction of tidal flows throughout the great majority of the Delta and, since they do not reflect habitat and hydrodynamic conditions actually experienced by aquatic organisms, including fish, these flows are extremely poor indicators of habitat conditions and are not appropriate for protective standards or criteria or for biological analysis. The minority felt that real-tide Delta channel velocities (both ebb and flood) and other local physical and biological habitat conditions would be greatly superior tools for biological analysis, and should have been used instead of the average condition parameters. The minority felt that since tidal velocities in most delta channels are two orders of magnitude greater than net velocities, and since water velocity and water residence time (both of which can be modeled) are the hydrodynamic parameters most directly influencing fish and other aquatic organisms, comparing real-tide hydrodynamic conditions that would prevail for each alternative in various locations throughout the delta would give a much more accurate indication of differences among alternatives and would also lead to discovery of specific measures to improve hydrodynamic and physical habitat conditions on both gross and local scales. The majority argued successfully that this approach would be new and should therefore not be taken.

The goals adopted by the DEFT reflecting the majority perspective are given below, along with their underpinning hypotheses. Where appropriate, a minority hypothesis related to the goal is also given for perspective. Alternative goals are implicit in minority hypotheses.

1. Improve net flows west from the Central Delta (Q-West). (Majority Hypothesis: Net positive flows from the Delta would help reduce risk of fish moving toward and into the south Delta where they are subject to export.) (Minority Hypothesis: Net flows are a very small fraction of tidal flows throughout the great majority of the Delta and do not represent conditions actually experienced by aquatic organisms, including fish. The best approach is to improve local velocity fields, residence time and physical habitat conditions.)

2. Improve Delta outflow as measured by average X2 location in the Bay and Delta. (Majority Hypothesis: X2 is a potential surrogate for many factors related to fish survival and productivity in the Bay-Delta.) (Minority Hypothesis: X2 is not a satisfactory surrogate for the many factors which may be related to fish survival, because of uncertain synergies and/or antagonisms, among other factors. The relationships and relative importance of various factors to fish and to each other may change with altered conditions attending each alternative. The best approach would be to identify specific factors influencing aquatic resources and their modes of action and address them directly.)

3. Reduce negative flows in the south Delta toward the pumping plants at key times of the year. (Majority Hypothesis: Negative flows in the Old and Middle River channels in the south Delta are believed to influence the zone of influence of the pumping plants.) (Minority Hypothesis: Clifton Court Forebay gates are generally opened at high tide, and the hydrodynamic influence of these events is propagated outward and is felt primarily as a slight reduction in maximum ebb velocity. Therefore, the most effective means to promote production and reduce mortalities of aquatic resources within the zone of significant influence of the pumping plants is to increase overall water residence time in the Delta to allow for hatching and growth of early life stages and to implement significant interconnected habitat enhancement measures throughout the Delta, emphasizing conveyance corridors, to facilitate organism/habitat associations and food web interactions.)

4. Improve flows in the lower San Joaquin River in April and May. (Majority Hypothesis: San Joaquin River salmon would benefit from higher transport flows in April and May, their key outmigration period. The existing VAMP period of 30 days of increased flows and lower exports does not adequately protect outmigrating salmon from San Joaquin tributaries.) (Minority Hypothesis: VAMP is an experiment which has not yet been conducted and from which conclusions cannot yet be drawn. Furthermore, data analyses on the relationship between export/inflow ratios and San Joaquin salmon protection do not show a relationship between adult production (harvest plus escapement) and Vernalis flows. The greatest protection for San Joaquin salmon can be provided through the installation of an operable barrier at the head of Old River capable of operating at as high a Vernallis discharge as practicable, and the use of this and near-real-time "flexible operations" to maximize salmon smolt protection while maintaining water reserves for environmental and other benefits.)

5. Reduce the export to inflow ratio in fall and winter. (Majority Hypothesis: Higher export/inflow ratios in fall and winter in recent decades are associated with declining populations of winter run and late-fall run chinook salmon and delta smelt.) (Minority hypothesis: Relationships between export to inflow ratios and population strength of winter run and late-fall run chinook salmon and Delta smelt are either non-existent or extremely weak and may be spurious. For salmon, decreasing export to inflow ratios did not have an effect on total adult returns, whereas harvest restrictions implemented for the protection of winter run chinook did have salutary effects on this and other salmon stocks. Continued "progressive" harvest management and near-real-time "flexible operations" coupled with an aggressive Real Time Monitoring Program,

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including aggressive development of better monitoring methods for Delta smelt, would be a superior method to afford protection for these species.)

6. Reduce the potential for movement of outmigrating juvenile San Joaquin salmon into the south Delta via the Head of Old River. (Majority Hypothesis: Survival of outmigrating San Joaquin salmon is much lower even in wetter years if they pass into the Delta via the Head of Old River.) (Minority Hypothesis: Survival of outmigrating San Joaquin salmon is much higher if they are not subjected to entrainment, salvage, transportation and release as a consequence of passing directly in front of the pumping plants, and anything that can reduce direct exposure to entrainment, such as a barrier at the head of Old River which can be operated over a wide range of Vernalis flows, will improve survival of these fish.)

7. Reduce the movement of juvenile Sacramento River salmon into the interior Delta via the DCC and/or Georgiana Slough. (Majority Hypothesis: Survival of juvenile salmon released in these areas is much reduced over those released in the lower Sacramento River below the DCC.) (Minority Hypothesis: The hypothesis that "survival" of juvenile salmon entering the Delta is significantly depressed relative to those which do not enter the central Delta is greatly overstated. Recovery prospects of naturally-produced salmon stocks will be greatly enhanced over existing conditions by improving habitat, food web and predator/prey relationships within the interior Delta, and recovery may not be able to occur absent these improvements. Within the central Delta, large, interconnected acreages of gently sloping, vegetated intertidal areas with many distributary channels, among other things, will provide excellent rearing and migratory habitats with ample refugia for juvenile salmon derived from the Sacramento River and its tributaries as well as eastside tributary streams, and will accelerate recovery of these stocks.)

8. Reduce exports at key times of the year. (Majority Hypothesis: High export rates in winter and spring appear to reduce survival of important fish.) (Minority Hypothesis: Water export constraints should be made on the basis of population-level effects. High export rates in the presence of high densities of vulnerable life stages of fish and other aquatic organisms near the pumping plants results in high entrainment rates and potential population-limiting losses. Reducing exports at times when entrainment rates leading to high adult-equivalent losses are likely to occur, as indicated through near-real-time monitoring, will significantly reduce the likelihood of population-limiting losses.)

9. Reduce losses of juvenile fish at Tracy and Clifton Court Forebay fish facilities. (Majority Hypothesis: Existing fish facilities are inefficient and cause significant loss to predation in the forebay and to mortality of salvaged fish in handling and trucking.) (Minority Hypothesis: The best way to reduce excessive pre-louver predation, separation, handling, transportation and post-release predation losses associated with the operation of the pumping plants is to expeditiously install modern, well-designed and well-maintained screening, separation, sorting, holding, transportation and release facilities at both the CVP and the SWP, with the screening facilities at the SWP located at the entrance to CCFB. This should be coupled with an aggressive, focused predator reduction program in specific problem areas, especially along migration corridors.)

10. Make habitat in the central and south Delta more "fish friendly". (Majority Hypothesis: A through-Delta alternative should require improved habitat in the central and south Delta to not only slow fish movement toward pumping plants, but to increase food supply and fish growth and survival, which are adversely affected by south Delta exports.) (Minority Hypothesis: A through-Delta alternative should require improved habitat in the central and south Delta to not only slow fish egg and larval dispersal toward pumping plants to allow these life stages to mature, but to increase food supply and fish growth and survival, and facilitate fish/habitat relationships which may be otherwise adversely affected by changes in tidal hydrodynamics attributable to south Delta exports.)

11. Minimize effects on water quality and water supply from environmental actions taken to meet the above objectives. (Majority Hypothesis: The above environmental actions may reduce water quality in the Delta.)

Discriminating Factors

5/4 Replace the introductory sentence to this section with the following changes: Many factors, including flow, habitat and management practices, were considered by the Species Teams and the full DEFT. Those specific factors used by the species teams to evaluate DWR model output are listed below. As indicated earlier, a minority of the DEFT does not believe that these average condition parameters are good indicators of aquatic environmental conditions in the Delta and would have preferred analyses based on real-time hydrodynamics and physical habitat conditions.

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